

Swinomish FY 2014 Noncompetitive Tribal Projects for Restoration and Protection of Puget Sound

1. Project Title: Coast Salish Tribal Journey Water Quality Project (TJWQP)

2. Workplan Abstract:

The TJWQP research and monitoring addresses priorities identified by Coast Salish Tribal leaders and scientists concerning climate change and land use impacts to water quality and habitats that threaten traditional foods upon which many Tribes depend. Quantitative basin-scale variability in marine water quality and the influence of fluvial runoff (temperature, pH, turbidity) and coastal upwelling (pH and dissolved oxygen) are mapped through time to characterize processes influencing estuarine conditions which repeated annually, provide fundamental science to detect and assess estuarine responses to land use and climate change.

3. Tribe: Swinomish Indian Tribal Community

4. Project Location: Swinomish Reservation and adjacent nearshore areas, La Conner, Wash.: Salish Sea

5. Eligible Activities to be Addressed:

Activity B.1.1. Use complete, accurate, and recent information in shoreline planning and decision making at the site-specific and regional levels, by providing important quantitative water quality data to characterize physical and biological conditions and variability of the nearshore marine system where data are sparse.

Activity B.3.1. Protect intact marine ecosystems particularly in sensitive areas and for sensitive species by identifying and alerting of impaired water conditions including turbid, warm, or low dissolved oxygen real-time for authorities to address or scientists to respond to for additional investigation of causal mechanisms.

Activity C.7.1. Improve water quality to prevent downgrade & achieve upgrades of important current tribal, commercial, recreational shellfish harvesting areas through detailed spatial and temporal mapping of water quality conditions in shellfish harvest areas where data are sparse and by linking measurements to analyses of biophysical processes (drivers) and trends through time to assess cumulative impacts from climate and land use change.

Activity C.9.4. Develop and implement local and tribal pollution identification and correction programs through education, reports, and training workshops.

D2.2 NTA 1. Tribal Habitat Priorities:

1a-Establish quantitative metrics for habitats and restoration actions

1g-Develop comprehensive public outreach, awareness and behavior change program to promote public stewardship of Puget Sound resources.

3a-Identify and prioritize key habitat

6c- Monitor key habitat status and trends indicators for floodplain, channel migration zone, wetland, estuary, nearshore and Salish Sea habitat including stream flow, temperature, habitat extent and condition, prey and predator abundance and associated species complexes.

6e- Establish geographically appropriate measures to evaluate actions (reach, drift cell, etc).

In addition, the research and monitoring addresses priorities identified by Coast Salish Tribal leaders and scientists concerning climate change and land use impacts to water quality and habitats that threaten traditional foods upon which many Tribes depend. Quantitative basin-scale variability in marine water quality and the influence of fluvial runoff (temperature, pH, turbidity) and coastal upwelling (pH and dissolved oxygen) are mapped through time to characterize processes influencing

estuarine conditions which repeated annually, provide fundamental science to detect and assess estuarine responses to land use and climate change (<http://www.coastsalishgathering.com/01gathering/proceedings.shtml>). Documents such as these identify issues of exceptional concern among the broad scope of all Puget Sound protection and restoration issues and are integrated with environmental data to examine causal relationships.

6. Proposed Starting and Ending Dates:

February 1, 2015 to December 31, 2016

7. Project Coordinator (lead technical person):

Larry Wasserman, Swinomish Indian Tribal Community,
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8. Project Narrative:

a. Need for Project:

The Coast Salish Nation in partnership with the U.S. Geological Survey (USGS) examines the coastal waters of the Salish Sea using a novel strategy of spatially mapping water quality focusing on nearshore waters where terrestrial runoff can strongly influence coastal biological resources. In 2008, the multiyear environmental monitoring study was initiated, combining science and cultural practices. The foundation of the study is the annual Tribal Journey, during which canoe families traveling the ancestral highways, celebrate and share their rich cultural heritage. Canoes traveling at the pace of tides and currents along multiple routes are an ideal platform for simultaneously collecting surface-water measurements producing a real-time water property profile of the inland sea. The purpose of the Tribal Journey Water Quality Project (TJWQP) is to utilize the partnership to provide Coast Salish with additional science and monitoring capacity needed to develop and address questions and uncertainties around landscape and local scale water property patterns affecting the Salish Sea ecosystem.

Through the partnership, USGS provides valuable synthesis and interpretation of scientific measurements, helping to quantify environmental patterns, identify areas of impairment and through time, detect changes and trends related to land use and climate change. These results are used to implement follow-up studies with Coast Salish and partners seeking improved understanding of ecosystem vulnerability.

In addition to in-situ water samples from canoes, canoe pullers and scientists collect observational data providing context for the quantitative canoe-track data, special projects are conducted from support vessels, and moorings are deployed in select nearshore areas. The Journey routes stopping in each indigenous community throughout the Salish Sea are an excellent means to discuss and promote understanding of ecosystem issues, conservation and stewardship. Local indigenous knowledge shared during these visits helps guide the Project's focus and provides unprecedented opportunities to learn about the Salish Sea's natural history in ways science alone cannot offer.

The Tribal Journey's Water Quality Project has grown into a meaningful trans-boundary data collection and information sharing tool for Tribes, First Nations, federal (EPA) and state (WA Department of Ecology) agencies. Results are examined with Coast Salish partners, shared to the public via the web (www.usgs.gov/coastsalish) and through public presentations (<http://online.wr.usgs.gov/calendar/2009/oct09.html>), and are published in USGS and Coast Salish reports (Akin and Grossman, 2009; 2010, Grossman and Grossman, 2012; Grossman and Grossman, 2013).

Of concern are how climate and land-use change will impact water quality that supports the Salish Sea ecosystem. Surface, middle and bottom water temperature have already been documented to have increased over the last century (Beamish, 2011) and projections of climate change indicate that summer water properties are likely to be strongly affected by changes in the magnitude, timing and rate of seasonal shifts in climate forcing on air temperature, precipitation, snow/glacier melt and runoff, as well as coastal upwelling. (Tillmann and Siemann, 2011). Under projected climate change scenarios, retreating snowpack and glaciers reduce the spring freshet volume and lead to lower summer river low flows. As a consequence, a growing concern that we would like to address is the influence of lower flows of warmer fresh waters delivered to the Salish Sea during spring and summer months. In addition, we hope to refine our models relating increases in marine water temperature to increases in air temperature which we have shown to be strongly correlated and a proxy for future coastal conditions. Our efforts will also help quantify aspects of marine water intrusion into the Salish Sea associated with changes in winds and the strength and timing of coastal upwelling and its influence on Salish Sea estuarine water acidity and dissolved oxygen.

The TJWQP enters its eighth year in 2015 and has built strong collaborative relationships and scientific capacity to capture summer water quality conditions and quantify variability across the vast Salish Sea region. The proposed scope of work for FY14 will build upon the landscape scale data set generated from 2008 to 2014 through site-specific focused studies. Our data indicate that it is becoming increasingly important to better understand the changing temperature of streams and their contribution to marine water quality, particularly in light of climate change and projected loss of snowpack/glaciers. Canoe track monitoring as it has been done in the past will not be possible in 2015, as no Tribes or First Nations have stepped forward to host the Journey. In order to maintain continuity we will, when possible, monitor water properties during canoe practice day trips during July 2015. This funding will also allow the project to further develop outreach materials/presentations for participating Tribal/First Nation communities to learn more about how changes in water-quality are impacting their environment and life ways.

b. Project Tasks, Outputs, Deliverables, and Outcomes.

TJWQP staff are actively planning for 2015 (TJWQP year 8) and solicit assistance through this funding opportunity to conduct focused studies on the influence of freshwater inputs on nearshore habitats, analyze, and report on datasets. We also plan to invest in equipment that will allow the project to continue on past this funding cycle. Another significant focus of the FY14 funds will be to further develop outreach materials for Tribes and First Nation communities to learn more about how changes in water-quality are impacting their environment and life ways.

The TJWQP proposes to monitor water-properties (temperature, salinity, pH, and light, a proxy for turbidity) adjacent to large river deltas across the Salish Sea through moored buoys and canoe tracks where possible. We will also try to establish networks of stations by leveraging our efforts with partners (other Tribal Natural Resource Departments, USGS, and NOAA) that maintain monitoring in the Stillaguamish, Snohomish, and other river delta systems. This will allow us to better link nearshore responses in water quality to conditions within the lower rivers and quantify the frequency of drivers and responses (e.g. high stream flows-freshwater export, low stream flow flows-marine inundation and high temperature anomalies). Data will be analyzed along with other environmental driver data (e.g. stream flow, local precipitation, air temperature, coastal upwelling index as in past years) and evaluated using Washington State Water Quality criteria, highlighting the spatial and temporal variability in water-quality across study sites. The 2015 data will be analyzed in conjunction with previous years Journey results to highlight areas of concern and to improve our understanding of the extent of freshwater inputs on nearshore environments. This proposal section is a key element that provides information for the Puget Sound Partnership Action Plan under international outreach, public and cross agency information sharing.

Task 1: Project Planning and Coordination

- i. Secure and manage funding,
- ii. QAPP addendum development,
- iii. Attend Canoe Journey meetings to plan monitoring locations and study logistics with Canoe Families,
- iv. Secure instrumentation and supplies for monitoring, and
- v. Recruit, coordinate with, and manage technicians/volunteers

Task 2: Gather water-quality data at select sites across the Salish Sea to quantify variability, detect changes and trends, and identify areas for future study.

- i. Assemble and deploy instrument packages
- ii. Coordinator will serve as technician to operate equipment and collect data during project period
- iii. Ensure that quality control procedures outlined in the TJWQP QAPP are implemented.

Task 3: Analyze data and synthesize results of TJWQP data results into maps, GIS data layers, and reports for public dissemination.

- i. Data entry, record keeping, and application of data quality criteria procedures to datasets
- ii. Create GIS layers of the data collected to support analysis tasks
- iii. Analyze data; includes obtaining the supporting environmental (meteorological observations, upwelling indices, tides and currents, and river discharge) datasets used to aid interpretation of TJWQP results.
- iv. Facilitate additional analyses with USGS scientists and Washington State Department of Ecology, and
- v. Work with USGS and Western Washington University to maintain a web-based data query system to facilitate dissemination of TJWQP data to Tribes, First Nations, and other interested agencies or academic institutions. <http://walrus.wr.usgs.gov/infobank/>

Task 4: Continue to develop the TJWQP outreach materials and strategic plan

- vi. Develop web-based Tribal Journey Water-Quality Project outreach materials for effective dissemination of project data, accomplishments, publications, and contributions to Salish Sea science.
- vii. Travel to participating Tribal/First Nation communities to report out on project findings and accomplishments.
- viii. Co-author reports, posters, brochures, websites, and presentations disseminated online, and at regional meetings/conferences.
- ix. Semi-annual project review with TJWQP Partners – USGS, Northwest Indian College, Western Washington University, University of Washington, and others. This task will assist the TJWQP with programmatic and technical review of program activities.

Outputs:

1. Successful completion of data collection at multiple mooring stations and creation of GIS data layers of 2015 results with emphasis on quantifying the frequency distribution of nearshore water property conditions at each site and frequency of water quality exceedance values. Additional outputs will include analyses of correlations between drivers and measured outputs

2. Generate a report and peer-reviewed journal article detailing results of the 2008 to 2015 Tribal Journey Water Quality Project – Journey findings
3. Attend regional meetings to disseminate project findings to canoe families
4. Update website (www.usgs.gov/coastsalish) with 2015 results, presentations, and public outreach opportunities

Deliverables for the FY14 TJWQP proposal include:

- Continuation of the water-quality data collection of the Salish Sea and expanding the research to include focused studies of temporal and topical issues of concern to Coast Salish are aimed at developing empirical and mechanistic models to predict future habitat conditions and variability relative to biophysical processes (drivers). The project also intends to strengthen the partnerships and collaborations toward shared projects, information sharing, and trans-boundary opportunities, trainings and creating and enhancing communications and tools for sharing results with the public.

[illegible]

9. Budget:

Annual Budget Summary for FY 2014 PSP/EPA Work Plans

<u>Salaries</u>	<u>\$ 5,850</u>
<u>Fringe Benefits</u>	<u>\$ 3,159</u>
<u>Travel</u>	<u>\$ 1,953</u>
<u>Supplies</u>	<u>\$9,038</u>
<u>Communications/Utilities</u>	<u>\$ 0</u>
<u>Equipment/Vehicle Rental</u>	<u>\$ 0</u>
<u>Equipment/Vehicle O&M</u>	<u>\$ 0</u>
<u>Sub-contracts</u>	<u>\$ 0</u>
<u>Capitalized Equipment</u>	<u>\$ 0</u>
<u>Professional Services</u>	<u>\$ 0</u>
<u>Other</u>	<u>\$ 0</u>
<u>Total Direct Costs</u>	<u>\$ 20,000</u>
<u>Indirect Costs</u>	<u>\$ 0</u>
<u>Grand Total</u>	<u>\$ 20,000</u>

Task Delineated Budget for FY 2014 PSP/EPA Workplans

	<u>Task 1</u>	<u>Task 2</u>	<u>Task 3</u>	<u>Task 4</u>	<u>Total</u>
<u>Salaries</u>	\$ 753	\$ 2,511	\$ 1,758	\$ 828	\$ 5,850
<u>Fringe Benefits</u>	\$ 407	\$ 1,356	\$ 949	\$ 447	\$ 3,159
<u>Travel</u>	\$ 285	\$ 834	\$ 0	\$ 834	\$ 1,953
<u>Supplies</u>	\$ 0	\$ 8,798	\$ 0	\$ 240	\$ 9,038
<u>Communications/ Utilities</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Equipment/ Vehicle Rental</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Equipment/ Vehicle O&M</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Sub-contracts</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Capitalized Equipment</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Professional Services</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Other</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Total Direct Costs</u>	\$ 1,445	\$ 13,499	\$ 2,707	\$ 2,349	\$ 20,000
<u>Indirect Costs</u>	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
<u>Total</u>	\$ 1,445	\$ 13,499	\$ 2,707	\$ 2,349	\$ 20,000

Budget Narrative

Salaries:

Sarah Grossman, Environmental Specialist will perform all of the proposed tasks funded under this agreement.

Position/Title	Annual Salary	FTE %	Hours	Annual Cost (FY14)	Annual Fringe Cost (FY13)
Environmental Specialist	\$ 52,166	11%	233	\$5,850	\$ 3,159

Fringe Benefits:

Employee benefits have been calculated based on the Swinomish approved rates for full benefit eligible employees of 42% based on a 40 hour work week. Employees are considered full time if they work 30 to 40 hours per week. The fringe rate for a 30 hour per week employee is 54%.

Travel:

Travel Description	Mileage (0.57/mile)	Lodging	Per Diem	Nights	Ferry	Cost
Task 1: Regional Meetings	\$ 285					\$ 285
Task 2: Data Collection	\$ 140	\$ 318	\$ 236	2	\$ 140	\$ 834
Task 4: Project Outreach	\$ 140	\$ 318	\$ 236	2	\$ 140	\$ 834

Travel funds for the TJWQP are requested to accomplish tasks 1, 2 and 4.

Task 1: Regional meetings occur at various locations across the Salish Sea. Project staff will use mileage funds for local travel from Swinomish to meeting locations.

Task 2: Data collection during the TJWQP requires staff to travel to the field sites to deliver/retrieve and maintain instrument packages. Funds are requested to cover mileage, per diem, lodging, and B.C. ferry costs for sites on Vancouver Island.

Task 4: Reporting out to the canoe families and project partners is an important part of the TJWQP. Funds are requested to cover mileage, lodging (2 nights on Vancouver Island), per diem, and B.C. ferry costs.

Supplies:

Supply Description	Cost/Unit	Quantity	Total Cost
Onset Temperature/Salinity Logger	\$ 750	4	\$ 3,000
Onset Temperature/Light Logger	\$ 64	16	\$ 1,024
Onset Temperature Logger	\$ 59	16	\$ 944
Onset Water Level Logger	\$ 600	4	\$ 2,400
Onset Tilt Logger	\$ 84	4	\$ 336
Waterproof Shuttle	\$ 250	1	\$ 250
Software	\$ 100	1	\$ 100
Batteries (5 pack)	\$ 12	5	\$ 60
Deployment Hardware/Supplies			\$ 684
Adobe Illustrator 1-year license			\$ 240

The above supplies will outfit four moored suites capable of measuring surface-water temperature, salinity, and light; depth of water at the site, temperature and light at three depths per suite, and relative direction of water movement at the site.

Communications/Utilities:

No funds for communications/utilities are requested through this proposal.

Equipment/Vehicle Rental:

No funds for equipment/vehicle rental are requested through this proposal.

Equipment/Vehicle O&M:

No funds for equipment/vehicle O&M are requested through this proposal.

Sub-contracts:

No funds for sub-contracts are requested through this proposal.

Capitalized Equipment:

No funds for capitalized equipment are requested through this proposal.

Professional Services:

No funds for professional services are requested through this proposal.

Other:

No funds for other are requested through this proposal.

Indirect Costs:

Swinomish Indirect costs have been waived for this project.

10. Project Management:

The project management will be overseen by Larry Wasserman, Environmental Policy Director. Through regular meetings with key staff and project consultants the project's timelines, deliverables, and reports will be evaluated to insure that project goals are met. Sarah Grossman, Environmental Specialist, will be responsible for implementing project tasks. Ms. Grossman has successfully coordinated and implemented water property monitoring of the Salish Sea through the TJWQP since project initiation in 2008. Project quality assurance will be carried out by Dr. Eric Grossman of the U.S. Geological Survey (USGS). The USGS has been a significant project partner and has ensured that the water property monitoring complies with quality assurance procedures through QA/QC standard procedures outlined by the agency.

11. Local Coordination and Project Cooperators:

U.S. Geological Survey – Staff time is matched through USGS for project planning, data collection, and data analysis. USGS and the Department of Interior provide salary support for USGS staff involvement and equipment for use toward the project and dissemination of results.

Tribal Journey Canoe Families – Canoe families from across the Salish Sea volunteer space on their canoes to provide the base platform from which we conduct our research. In previous years Tribal staff and support boats volunteered to help conduct data collection across the Salish Sea.

12. Technical review:

Technical review of the data products produced by the Tribal Journey Water Quality Project are peer-reviewed by U.S. Geological Survey technical review teams and also the Tribes/First Nations participating in the project.

13. Severability:

If funds are not acquired to fulfill subsequent years, project budget, data collection, analysis and reporting will still occur with amendments made to the sampling design. The modified work plan for the base project would include canoe track data collection along one or two Journey routes (South Puget Sound and North Georgia Strait being the primary focus). A significant portion of the FY14 funds will be used to procure instrumentation that can be used for the TJWQP into the future, as well as for other research efforts conducted by Swinomish. Volunteer staff and equipment loans/donations will also be solicited to fulfill unmet funding needs until additional funding can be obtained. The participating Tribes/First Nations have expressed a desire for this project to continue on into the future, fully realizing the value of a long-term dataset.

14. Agricultural Lands Riparian Buffer (if applicable): Not Applicable

15. Non-duplication:

The TJWQP is a unique baseline water-quality monitoring program with a trans-boundary focus. One aim of the TJWQP is to supplement federal, provincial, state, and Tribal water-quality data with a landscape and local scale sets of dense spatial data collected primarily during summer months. This dataset has the ability to identify landscape and site specific oceanographic patterns across the Salish Sea. The ocean going Coast Salish canoes towing instruments make an ideal platform for sampling; as they only minimally disturb the surface layer of water when they travel.

16. References:

- Akin, S.K., and Grossman, E.E., 2010, Coast Salish and U.S. Geological Survey 2010 Tribal Journey water quality project: United States Geological Survey Open-File Report 2010-1143, 60 p. [<http://pubs.usgs.gov/of/2010/1143/>].
- Akin, S.K., Grossman, E.E., Lekanof, D., O'Hara, C., 2009, Coast Salish and U.S. Geological Survey: Tribal Journey water quality project, Coast Salish Gathering Report 2009-001, 58 p. [last accessed March 1, 2010, at <http://walrus.wr.usgs.gov/reports/reprints/TJWQP.pdf>]
- Beamish, D. 2011. The changing Strait of Georgia ecosystem. Report for the Salish Sea Conference Proceedings. [O8 Proceedings Beamish.pdf](#)
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- Grossman, E.E. and Grossman, S.K. (2012). Salish Sea Surface Waters: Tribal Journey Water Quality Project (TJWQP). In, PSEMP Marine Waters Workgroup, Puget Sound marine waters: 2011 overview. (Eds.) S. K. Moore, R. Runcie, K. Stark, J. Newton and K. Dzinbal. http://www.psp.wa.gov/downloads/psemp/PSmarinewaters_2011_overview.pdf.
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- Tillmann, P. and Siemann, D. 2011. Climate Change Effects and Adaptation Approaches in Marine and Coastal Ecosystems of the North Pacific Landscape Conservation Cooperative Region: A Compilation of Scientific Literature. p. 279. [https://www.nwf.org/pdf/Marine%20Report%20Chapters/NPLCC_Marine_Climate%20Effects_Draft%20Final_Chapter1.pdf]